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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/808,843	03/15/2001	Peter Crane	169.12-0487	5267

164 7590 01/09/2004

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312 SOUTH THIRD STREET  
MINNEAPOLIS, MN 55415-1002

EXAMINER

CHEN, TIANJIE

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 01/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/808,843

Applicant(s)

CRANE ET AL.

Examiner

Tianjie Chen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on telephone interview on 01/05/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6 and 21-23 is/are allowed.
- 6) ☒ Claim(s) 7-10, 12-17, and 20 is/are rejected.
- 7) ☒ Claim(s) 11, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 10.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: *letter*.

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***Final Rejection (Substitution)***

1. This is a substitutive office action to substitute the Final Rejection mailed on 12/22/2003.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 7-10, 12-16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al (US 6,466,412) in view of Takeuchi et al (US 6,456,934).

With regard to claim 7, Adams et al shows a disc drive having an inherent recording disc rotatable about an axis, a slider 20 (Fig. 2; column 3, line 66 to column 4, line 1) supporting a transducing head for transducing data with the disc, and a actuation assembly supporting the slider to position the transducing head adjacent a selected radial track of the disc, the actuation assembly comprising: a movable actuator arm 32; a suspension assembly 12 supported by the actuator arm (Fig. 2; column 3, line 66 to column 4, line 13), the suspension assembly including a flexure 16; a slider holding pad 50 supporting the slider;

Adams et al does not show a dual-stage actuation assembly supporting the slider to finely position the transducing head, and a microactuator.

Takeuchi et al shows a microactuator in Fig 21(d) including: a rotor 72 attached to the slider (Column 18, line 57 and 14, lines 10-18); a stator 70; and a beam

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structure (73 A-D and 74 A-B) operatively connecting the rotor 72 and to the stator 70 (Column lines 9-25) so as to permit movement of the rotor with respect to the stator, wherein the beam structure limits deflection of the rotor out of a plane defined by the microactuator; the beam structure including a first beam pair element 73B and 73C aligned with a width of the rotor and a second beam pair element 73A+74A and 73D+74B aligned with a length and the width of the rotor.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the microactuator taught by Takeuchi et al into Adams et al's device in following way: the slider is attached on the rotor, and then a stator would be attached to the flexure thus forming a dual-stage actuation assembly. The rationale is as follows: Takeuchi et al teaches that the microactuator can be used for positioning the slider on the sub-micron order (Column 1, lines 31-33). One of ordinary skill in the Art would have been motivated by Takeuchi et al's teaching to add the micro-actuator, thus obtaining a sub-micron precision.

With regard to claim 8, Takeuchi et al further shows that the first beam pair element comprises two first beam elements 73B and 73C.

With regard to claim 9, Takeuchi et al further shows that the two first beam elements define a rotation center (Fig. 21(d); column 18, lines 53-58), the rotation center defining a center of in-plane rotation of the rotor.

With regard to claim 10, Takeuchi et al further shows in Fig 21(d) that the rotor 72 is balanced about the rotation center since the structure is symmetrical.

With regard to claim 12, Takeuchi et al further shows that the second beam pair element includes two second beam elements 73A+74A and 73D+74B in a dog-leg configuration, comprising: a left lateral beam wherein the length of 74A is aligned with

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the length of the rotor and the transverse length of 73A is aligned with the width of the rotor; and a right lateral beam wherein the length of 74B is aligned with the length of the rotor and a transverse length 73D is aligned with the width of the rotor.

With regard to claim 13, Takeuchi et al further shows that the second beam pair element 74A is connected to the stator 70.

With regard to claim 14, Takeuchi et al further shows that a proximal connector (the portion of 74A near the stator 70 connecting the proximal end of the rotor 70 and the second beam pair element 74A+73A.

With regard to claim 15 Takeuchi et al further shows that the proximal connector is attached to the left lateral beam and the right lateral beam.

With regard to claim 16, Takeuchi et al further shows that the beam structure has a height of approximately 200 microns (Column 19, lines 61-64).

With regard to claim 20, Adams et al shows a disc drive having an inherent recording disc rotatable about an axis, a slider 20 (Fig. 2; column 3, line 66 to column 4, line 1) supporting a transducing head for transducing data with the disc, and a actuation assembly supporting the slider to position the transducing head adjacent a selected radial track of the disc, the actuation assembly comprising: a movable actuator arm 32; a suspension assembly 12 supported by the actuator arm (Fig. 2; column 3, line 66 to column 4, line 13), the suspension assembly including a flexure 16.

Adams et al does not show a dual-stage actuation assembly supporting the slider to finely position the transducing head; and a microactuator including: a rotor attached to the slider; a stator attached to the flexure; and means for operatively connecting the rotor to the stator so as to permit movement of the rotor with respect to

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the stator, wherein the means permits microactuation of the microactuator while limiting motion of the stator out of a horizontal plane of the microactuator and limiting motion of the slider longitudinally.

Takeuchi et al shows a microactuator in Fig 21(d) including: a rotor 72 attached to the slider (Column 18, line 57 and 14, lines 10-18); a stator 70; means including beam structure 73 A-D, 74 A-B, 73A+74A, and 73D+74B for operatively connecting the rotor to the stator so as to permit movement of the rotor with respect to the stator, wherein the means having a thickness of 300 microns (Column 19, lines 61-64) permits microactuation of the microactuator, which resists motion of the stator out of a horizontal plane of the microactuator and resisting motion of the slider longitudinally since which has aspect ratio as low as 0.4 (Column 19, line 65-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the microactuator taught by Takeuchi et al into Adams et al's device in such a way: the slider is attached on the rotor, and then a stator would be attached to the flexure thus forming a dual-stage actuation assembly. The rationale is as follows: Takeuchi et al teaches that the microactuator can be used for positioning the slider on the sub-micron order (Column 1, lines 31-33). One of ordinary skill in the Art would have been motivated by Takeuchi et al's teaching to add the micro-actuator, thus obtaining a sub-micron precision.

3. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al and Takeuchi et al as applied to claim 16 above, and further in view of Applicant Admitted Prior Art (AAPA).

With regard to claim 17, Takeuchi et al does not show that the rotor stresses the beam structure to less than approximately 8.8% of its breaking strength.

However, AAPA shows that the rotor stresses the beam structure to about 8.8% of its breaking strength (p. 7 line 22 to p. 8, line 3 in Specification).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to expect that the rotor stresses the beam structure to about less than approximately 8.8% of its breaking strength, which includes less than approximately 8.8% of its breaking strength because 8.9% is approximately 8.8% and 8.8% is less than 8.9%.

***Allowable Subject Matter***

4. Claims 1-6 and 21-23 are allowed.

Claims 11, 18, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 1, as the closest reference, Takeuchi et al (US 6,465,934) shows a microactuator having a stator and a rotor which holds the slider and is movable with respect to the stator; but fails to show means for limiting deflection of the rotor out of a plane defined by the microactuator frame; wherein means is referred to a structure which is limited to the microactuator having exact structure shown in Figs. 3-5 and described in specification, pp. 4-6.

Applicant assumes that the above mentioned means would prevent the stator from significantly shifting vertically out of the horizontal plane of microactuator and minimize the amount of vertical deflection (p. 6, lines 20-22 in Specification).

- With regard to claims 11 and 21, as the closest reference, a combination of Adams et al (US 6,466,412) and Takeuchi et al (US 6,465,934) shows a microactuator, but fails to show a distal connector connecting the distal end of a magnet bonding pad and a slider bonding pad, wherein the distal connector is located at the rotation center.
- With regard to claims 18 and 22, as the closest reference, a combination of Adams et al (US 6,466,412) and Takeuchi et al (US 6,465,934) shows a microactuator, but fails to show at least one deflection limiter for limiting deflection in the direction of the length of the rotor.

Applicant assumes that the above mentioned structures would stop further movement of the slider as the slider is pulled away from the stator approximately 50 microns (pp 8-9 in Specification).

#### ***Response to Arguments***

5. Applicant's arguments filed 05/19/2003 have been fully considered but they are not persuasive. Since the beam structure always limits the deflection of the rotor in certain degree.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

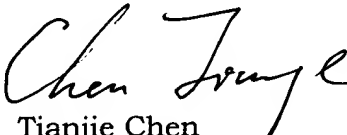


TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703)746-6037.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

  
Tianjie Chen  
Primary Examiner  
Art Unit 2652  
01/06/2004

<b>Interview Summary</b>	Application No.	Applicant(s)	
	09/808,843	CRANE ET AL.	
	Examiner	Art Unit	
	Tianjie Chen	2652	

All participants (applicant, applicant's representative, PTO personnel):

(1) Tianjie Chen (Primary Examiner, PTO). (3)\_\_\_\_\_.

(2) Gayle A. Bush (Representative). (4)\_\_\_\_\_.

Date of Interview: 05 January 2004.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.  
If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 21-23.

Identification of prior art discussed: None.

Agreement with respect to the claims f) ☐ was reached. g) ☐ was not reached. h) ☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Representative reports that claims 21-23 have not been treated in Office action mailed on 12/22/2003. Examiner will review the case and take appropriate action.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

\_\_\_\_\_  
Examiner's signature, if required



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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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EXAMINER
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ART UNIT	PAPER
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10

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

In response to Representative's request to consider the missed claims 21-23 made on telephone interview on 01/05/2004, a substitutive Office action with substitutive Office Action Summary and Interview Summary is enclosed for correcting the error in the previous Office action. The time period for response to this Office action will be restarted according to MPEP 710.06.

Tianjie Chen  
Primary Examiner  
Art Unit 2652